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MORTAR COMPOSITIONS CONTAINING LATEX BLENDS

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This invention appertains to concrete, mortar, and particularly, Portland cement mortar compositions modified with a blend of at least two interpolymer latex binders that are adapted to be employed for a variety of different uses where excessive vibration, heavy traffic and deteriorations due to corrosive liquids may be encountered.

The latex-modified mortar compositions of the present invention are ideally suited to be employed in the construction and particularly in patching, resurfacing, and repair of wooden and concrete floors, concrete pavements, roads, airfield runways, bridge floors, floor underlayments, ceramic tile grout and bedding work, Portland cement plaster compositions, coatings for industrial insulation, ornamental structures as brick and cement block mortars in applications requiring improved resistance and higher strength and in precast concrete slabs, panels, beams, sections and miscellaneous forms. The mortar compositions of the present invention are likewise adapted to adhere tenaciously to many other types of substrates such as glass, metal, wallboard and the like as well as being effective in common interior applications where added physical strength and bonding ability may be required.

In view of the wide applicability of latex-modified mortars, one of the primary objects of the present invention is to provide mortar compositions containing a blend of interpolymer latexes that provide advantageously improved physical properties, particularly wet shear-bond strength when used for exterior construction and resurfacing work, such as on bridge floors, highways, air strips and the like.

Another object of the instant invention is to provide mortar compositions modified with lesser amounts of blends of interpolymer latex binders which, after placement and curing, produce dry shear-bond strengths superior to other known interpolymer latex-modified mortar compositions containing appreciably greater amounts of only one interpolymer latex binder.

Another salient object of the present invention is to provide mortars modified with lesser amounts of an interpolymer latex blend which, when set, have equally advantageous compressive strengths, tensile strengths, flexural strengths as well as chemical and solvent resistance as have been produced with prior known latex-containing mortars modified with a single interpolymer latex.

With these and other beneficial objects in view, the invention consists in the combining of certain materials to form mortar compositions modified with a blend of at least two stable interpolymer latexes to provide mortar bonds with superior physical properties, when cured.

In accordance with the preparation of the mortar compositions of the present invention, the materials include a cement binder, an aggregate material, an interpolymer latex binder composed of a blend of at least two interpolymer latexes of water-insoluble, film-forming interpolymers, an antifoaming agent and water.

The cement binder referred to may be selected from the group of inorganic settable materials such as hydraulic, portland, natural or aluminous cement. Conventionally employed cement binders such as gypsum, a plaster of Paris, calcium sulfate, lime or a similar calcium binder, or a magnesium oxychloride or other magnesium or magnesite or oxysalt composition; or any other chemically hardening inorganic substance similar to those set out above which ordinarily have served as a suitable binder for unmodified concrete and mortar mixtures, advantageously may be completely omitted from the blended interpolymer latex-modified mortar formulations of the present invention. Surprisingly, the omission of chemically active binders has a decidedly beneficial effect on the properties of latex-modified mortar products of the present invention by providing the cured products in point with maximum physical properties. However, small percentages of these chemically active types of cement binders may be tolerated with a slight decrease in the best physical properties of the latex-modified mortars of the present invention.

The aggregate used may be stone, gravel, pebbles, granite, Carborundum, aluminum oxide, emery, marble chips, sawdust, cinders, asbestos, mica, talc, flint or manufactured particles such as powdered ceramic material; or any other particulate material which may serve the same conventional purpose as the preferred aggregate, sand. The intended end use of the mortar can undoubtedly serve as a guide to those skilled in the art as to the choice of preferred particle size of the aggregate material to be included in the blended interpolymer latex-modified mortars of the invention.

With concrete, mortar and, more particularly, Portland cement mortar of the present invention is incorporated an aqueous dispersion of a blend of at least two water-insoluble, film-forming interpolymer latexes in the proportion of from about 5 to about 20 percent by weight of polymer solids as based on the dry weight of the Portland cement mortar mixture.

A minute portion of an antifoaming agent, such as an emulsion containing about 10 percent solids of dimethylsiloxane with about 4 percent silica aerogel dispersed therein by means of an anionic or cationic emulsifying agent, may be added to the dry or wet mortar mixtures of the present invention to increase the mix density by precluding air from the wet mixture of aggregate, cement and latex particles. Thus, the antifoam agent improves the compressive, tensile and shear-bond strengths of the blended interpolymer latex-modified mortar compositions of the present invention. The amount of water which may be added to the mortar mixtures of the invention largely depends on the desired spreadable consistency of the mortar compositions. While the blend of latex interpolymer particles is distributed throughout the entire mortar compositions, the same do not coalesce until the latex-modified mortar compositions of the present invention have suitably cured and hardened.

Of additional benefit, as will be appreciated by persons skilled in the art, small amounts of humectants such as diethylene glycol and triethylene glycol may be added to the instant latex-modified mortars to assist in its ease of placement by effectively retarding somewhat the rate of curing of the blended interpolymer latex-modified mortars in point.

By "a blend of interpolymer latexes," in this instance, is meant the comingling or mixing of about 75 weight percent of an aqueous dispersion of a first water-insoluble, film-forming interpolymer latex with about 25 weight percent of an aqueous dispersion of a second water-insoluble, film-forming interpolymer latex composed of from about 60 to about 70 weight percent of styrene interpolymerized with from about 30 to about 40 weight percent of 1,3-butadiene to produce a stable aqueous dispersion of a blend of compatible water-insoluble, film-forming latexes.

The first interpolymer latexes (as well as the styrene/1,3-butadiene interpolymer latexes which are designated above as the second interpolymer latexes) are produced by the emulsion polymerization of addition interpolym-